ICL Forms As British Computer Firms Merge

By a COMPUTERWORLD Overseas Correspondent

LONDON – International Computers Ltd. (ICL), a firm that will lay claim to being the largest computer manufacturer outside the United States, and the seventh largest in the world, is being formed as a joint venture by three British computer makers under government backing.

The principal ingredients of the new firm are International Computers and Tabulators (ICT) and the commercial computer business of English Electric. ICT will own 53.5% interest in the new enterprise, and English Electric 18%. Plessey Co., which will form a joint venture with the new firm to study and exploit developments in computer and communications technology, also receives 18% of the new firm.

Larger Share for Britain

The formation of ICL is generally conceded to have been engineered and promoted by the British government's Industrial Reorganization Corp. in an effort to capture an increased share of the computer market in Europe for British industry. The British government, subject to the approval of Parliament, has agreed to make a $8.4 million capital investment in ICL, and to contribute research and development grants of $32.4 million over the next five years. The government will retain the remaining 10.5% interest in ICL.

The business plan for ICL, largely worked out by officials of ICT and the British government, call for ICL to continue to develop, manufacture, sell, and service ICT's current line of 1900 series computers, and English Electric's system 4 (based on RCA's Spectra series technology), and to make, sell, and service the Elliott 4100 computer which English Electric acquired from Elliott-Automation in a merger last year. The process control, industrial automation, and defense computers currently marketed by English Electric as its M.2100 range, Elliot 900 series, and Marconi Myriad computer will not be transferred to ICL.

New Lines

The principal objective of ICL is believed to be the development of a new line of computers for commercial and scientific applications which will capture 60% to 70% of the British market by 1975 and also gain 15% to 25% of the rest of the market in Western Europe. Currently ICT holds about 44% of the British computer market, and English Electric about 8%. IBM is believed to hold 44% of the British market and 80% of the market in the rest of Western Europe.

A spokesman for ICL said that it is "extremely improbable" that the firm will try to market its products in ____ and Canada, where U.S. _____ makers have already established ____ ble sales and service forces.

As a result of ICL's intention to develop a new computer series based on its own technology, it is expected that RCA's revenue from the British market as a licenser of computer technology to English Electric will be reduced. Also, ICT has been marketing the Univac 1004 in British and Australian markets, an arrangement which is not expected to be continued.

Speculation in London is that most of the personnel in ICL will be drawn from ICT's existing staff, and that the staff of English Electric Computers will have a minimal role to play in the new enterprise. It is also expected that ICL will initiate talks with leading computer manufacturers such as Siemens, Phillips, and the new French combine, C.I.I.

The formation of ICL is subject to the approval of the stockholders of ICT. ICT is 23.6% owned by Vickers Ltd., a large industrial concern, and 10.6% by Ferranti Ltd.

Core Up, Costs Down!

GE Puts Its Giant 600s In Its Time Sharing Network

NEW YORK – General Electric added its large scale 600 series to the computer resources available to users of its growing time sharing services. Only GE-265 systems were available. GE also introduced a time sharing service called Mark II. As a result of the changes, a GE user will be able to use whichever computer system he wants simply by dialing different numbers from his terminal. He will also be able to run much larger (50,000 character) programs than are currently available on GE systems.

The cost of running programs on the large scale 600 will be ten times as much per second ($.40 as against $.04) for computer time, but only about 1/10 of the time will be used. Connect time, which is being charged for, is also reduced, and as a result, it can be expected in most cases that a user will realize savings by using the bigger systems. Prepared by GE, a chart of comparative use for the two systems reveals that in some cases, the computer time usage ratios between the GE 200 and GE 600 series varies between 7 to 1 and 22 to 1.

The first of the Mark II systems scheduled for installation throughout the U.S. network is now fully operational in GE's Cleveland, Ohio, time sharing service center.

The service will be extended to western region customers with the installation of a second Mark II system in a new center now under construction in the Los Angeles suburb of Inglewood, Calif.

Additional Mark II systems will be installed to fully implement the

Privacy Somersault!

Time Sharing Featured At IEEE

NEW YORK – Time sharing came on strong at the Institute of Electrical and Electronics Engineers (IEEE) 1968 Convention. Many different firms were represented, including C-E-I-R, Data Network, GE, and Bolt-Beranek & Newman's Telcomp Services.

Many of the function presentations were similar, while the problem of comparative pricing for different services continued to be confusing as each service offered had its own type of pricing.

C-E-I-R, for instance, charged on the basis of "connect time" only. They were quoting a price of $6.25 an hour, on the basis of 20 hours use a month.

GE, by contrast, was making a special charge for computer time that varied from $.04 a second for their standard GE 265 systems to $.40 a second for the newly announced GE 600 time sharing services (see above). Bolt-Beranek & Newman were showing their Telcomp service, and distributing copies of their monthly newsletter which gave users a good idea of some of the day to day happenings in a time shared environment – something that is not often brought out before the user goes on-line!

The Subject Was Privacy

Another area of major computer related interest was the vexed subject of privacy. Apparently feeling that attack is the best form of defense, some engineers emphasized the advantages that could come out of electronic bugs safeguarding the rights of the individual. This was particularly stressed by John Foster of Avco.

Foster compared the present idea of security – which he pictured as being a superannuated employee clad in uniform, badge, and rusty revolver – with the time when security specialists would utilize the many defensive measures electronics can provide. He pointed out that the privacy of homes and of people can be protected by devices currently being developed, while unauthorized access to information held in computer data banks could be handled by the application of protective devices such as scramblers and encrypters.

Hewlett-Packard 9100A Calculator at the IEEE Meeting.

The offensive use of electronic devices, Foster stated, may itself be just and necessary in protecting the balance between the rights of the individual and the rights of society as well as the respective rights of different individuals. Legislation is required to replace the void that now exists. Such legislation should be subject to reasonable review by the courts in order to assure that the proper balance is maintained. Any use not authorized should be severely punished.

In spite of what electronic devices can or cannot do, offensively or defensively, the integrity of the individual is the essential element in the control of electronic devices. If we do not recover high standards of individual integrity, Foster emphasized, the nightmare world of 1984 as seen by George Orwell will be the real world of 1974.

The Calculator Challenge

At the same time that computers were being cast in this unusual role as a protector of privacy, the electronic calculator was continuing to show increasing strength, and was openly challenging the capabilities of small scientific computers.

Lasers Now In Use In Remote Scanning System

NEW YORK – A desk top scanner which includes a laser as the key unit of a new remote optical scanning service. The unit is actually a facsimile transmitter that can send complete copies of handwritten or typewritten material to a central point where one powerful optical scanner can be used to service not just one, but a number of different customers. The central service bureau then converts the information into a paper tape or magnetic tape form and returns it to the originator for use on his own computer.

User Pleased

The system is being marketed by Cognitronics and the month's rental price per scanner is $425 plus use charges. The only actual operating account, National Biscuit Company, currently reckons to be paying about $4000 per month for their two scanners and various use charges.

They are handling some 45,000 documents per day in five hours and, according to Mr William O'Hare, are very pleased with the results. They have been using optical scanners for the past ten years, but were doing it completely inhouse and producing punched cards. Now this operation

Cobol Voting 30 – 0 For Standard

NEW YORK – BEMA, the Business Equipment Manufacturers Association, is almost ready to submit its proposal for a standard Cobol language to the USASI's Information Processing Systems Standards Board.

Thirty members have voted in favor of submitting the proposal to the standards board. No members have voted against the proposal. But six members, including the Association for Computing Machinery (ACM) have not yet voted. "As of now there is no reason to think the board will not approve," Charles Phillips of Bema told COMPUTERWORLD. The remaining votes are being rounded up, he said, and the report is expected to be submitted to the standards board "very shortly." The final report may be published as early as September.

Informed sources said that USASI (United States of America Standards Institute) feels that the new Cobol report should be copyrighted, while Bema feels that it should not be. No one can lawfully reproduce any part of a copyrighted document without permission from the party who owns the copyright.

The 200-page document is said to be "pretty much the same thing" as the 1965 Defense Department report on Cobol. The new document is in the hands of an editorial committee that is closely analyzing every part. One "controversial" part has been removed from the text and put in an appendix, Phillips said. "Voters" include groups of users and equipment producers, as well as "general interest" groups.

Editorial analysis is expected to take until May. Preparation of a final draft will take an additional 90 days, Phillips predicted.

Editorials

Internal Questions

Looking through the paper this week you will find a number of new features. We have, for instance, an Applications page. We also have a section of trade news and the financial page has been revamped. We hope that you will like them.

Next week there will be some more new pages. Again, we hope you are going to like them. But, we do not know that you will. COMPUTERWORLD is new, and being at the center of it we can hardly get things in proper perspective. These are features that we expect to incorporate on a permanent basis. However, we need to know what *you* want, and what *you* think. Please look at the pages. Consider whether or not they are appropriate, and what it is you, the user, wants.

Thank you very much, and we look forward to hearing from you.

Welcome Issues

One of the criticisms made of the ACM is that it is effectively an "in group." The current president, Dr Oettinger, is attempting to combat this by giving the candidates for the next term an opportunity to make their positions known. However, these have not yet been published.

In the meantime, COMPUTERWORLD is glad to note that some issues are appearing so that the candidates can be elected not so much by popularity, but rather on the basis of policies that the members want carried out. The reported issue on page 3 — whether or not it is proper to trademark or otherwise protect languages — is a very real one.

We hope that all candidates will declare what their positions are.

An Analog for Standards?

The response of Van Horn in the current FCC inquiry is an interesting comment on our own standardization problems. Apparently, despite the fact that the communications industry is probably the most highly standardized operation in existence today, it is still not possible for a user to know whether or not the standards are being maintained.

This suggests that the common carriers may provide a useful analog of our own situation.

It's Often Little Things That Count - Like Printouts!

Last week in COMPUTERWORLD we talked about a new version of a program that replaces the 360 Link Editor. The program is designed for comparatively short computer jobs, and that is not unusual. The program, LDR, is a proprietary product of American Data Products, Raleigh, North Carolina, and is designed to reduce the time spent in link-loading. This it does — but it also does other things which are important.

The two printouts shown below were produced by the same program running under the Link Editor and under the Loader. In one case the location where the program is actually loaded is given. In the other case is not.

In the one case the symbolic names are arranged in alphabetical order so that they can be found. In the other case, they are not, so that in order to search for one you may have to look in every possible position. (See how long it takes you to find whether HCUDFXZ does or does not exist on the left hand printout. Then do it for the right hand one.)

In the first case, the numbers have been translated from hexadecimal with its A, B, etc. to decimal. In the other case they have not.

These are all little things. Normally, when the program works they do not help anyone in the least. But, when the program does not work, why don't you ask a programmer, if you are not one yourself.

Little bits are important in computing. They can treble the time it takes to debug and to recover from errors. Of all the operations in data processing, it is this area of recovery from error that has been consistently overlooked. One thing is sure – it is the little bits, like the different printouts in the Link Editor and the Loader, that are going to make a vital difference.

Standard IBM Printout

ADP Link-Loader Printout

The Big Thing . . .

The important point in the design of the LDR was the saving of link-load time. The figures above show that this objective was achieved. The upper chart shows original elapsed time for a specimen program — 1 min 29 seconds. The lower chart shows the elapsed time for the same program with the new: reduced to 26 seconds!

. . . And the Little Things That Count

In the print-outs below, the points circled are only little things!

Standard IBM Printout

ADP Link-Loader Printout

Size now given in decimal

Now in alpha sequence

Address now given in absolute

Letters to the Editor

To the Editor:

The Wall Street Journal's account of the Federal Communications Commission hearings concerning possible regulation of data processing services completely ignored the independent service bureaus whose continued existence depends on common carriers being restrained from taking unfair competitive advantage of their privileged position as a government-sponsored monopoly with a guaranteed profit.

As a relative corporate midget among the giants joined in battle, I feel compelled to present the position of VIP Systems, a computer time sharing service bureau whose corporate future will be greatly affected by the outcome of this battle. Our concerns are stated clearly in the attached copy of our response to the FCC inquiry.

While it is not an elaborate presentation, it is an honest expression of our interest in this matter. As such, it is certainly as pertinent to the inquiry as those responses filed by corporate giants with much more to gain and not nearly so much to lose from regualtion of data processing services.

J.M. Van Horn
President
VIP Systems
Washington, D.C.

Some of the points in VIP Systems' brief are on page 3. Incidentally, the COMPUTERWORLD story did mention the position of service bureaus – even though *Wall Street Journal* ignored it. Ed.

To the Editor:

I would very much appreciate any information you could provide concerning use and application of computers to elementary education.

I am particularly concerned with where this is being used successfully, such as names and locations of schools.

Having been an ardent reader of your newspaper for some months, I wish to comment that it is a very interesting and informative publication. Keep up the good work!

Gary Kirkendall
Assistant Manager
Data Processing
Council Bluffs Savings Bank
Council Bluffs, Iowa

Can some readers help him? Ed.

Candidate Takes Position

Galler Example Turned Back On Him As He Condemns Trademarks

In a continuation of his fight against proprietary packages, Dr Bernard Galler, who is running for the ACM presidency, has used Snobol as an example of the non-proprietary style of package he likes -- and has had that example used to counter him.

In a letter in the March ACM Communications, he instances the policies of Rockford Research Institute, Cambridge, Mass. which is currently attempting to protect their TRAC language by copyright.

Galler compares this to an equivalent movement some years ago to protect Comit. This, he says, led to the creation of Snobol, "which was inevitably superior" and was released to the public with the right of others to make extensions -- as was done by young people at universities.

This example, carried forward to the present situation where there are complaints about noncompatibility between Snobol dialects was also used to rebut Galler's opinions by Calvin Mooers, president of Rockford Research, and originator of TRAC. Quoting the November 1967 Snobol Bulletin as his source, he says that there exists deep concern regarding serious incompatibilities among the many home-made implementations of the language. In addition, Mooers says, there are serious complaints over the profound lack of "upward compatibility" between the various Snobols.

He summarizes his case against Galler's views with an appeal to the needs of the users, saying that the present incompatibility is intolerable to them, and that they know it.

In Case A Fire Comes Calling

Wright Line's new Data-Bank Fire Vault (shown at right) is designed to provide maximum protection for vital EDP records stored either on tape or disk packs.

The new vault carries the Underwriters Laboratories' 150 degree, two hour label for storage of EDP media. The level at which read out errors can occur is 150 degree temperature and 85% humidity, according to Wright Line. They claim that the vault will hold interior temperature and humidity "well below" that level even when the vault is exposed to a raging fire for up to two hours.

The vault features a double safe construction with an outer safe and an inner repository. A variety of internal configurations are available for the storage of tape.

IEEE Shows Time Sharing & Logic In Calculators

Continued from page 1

Hewlett Packard displayed a new $5000 calculator that has added both branching and looping instructions to its 196 step capability. The programs are stored on a reusable credit card sized magnetic card. David Packard, Hewlett Packard chairman, explained that one particular area of the expected market was teaching math to high school students. The speed of the device, and the use of a 10 significant number range, will allow it to deal with very small and very large numbers at the same time, without having to carry decimal points in your head.

Service Bureau Says That Wrong FCC Decision Could Kill Trade

WASHINGTON, D.C. — A time sharing service bureau has called for an outright ban on the provision of data processing services by common carriers, and has suggested that difficulties in getting good communications is being caused by common carriers failing to live up to their own standards rather than anything else.

Van Horn Information Processing Systems (VIP Systems), formed in 1966, has filed a response in the current FCC inquiry in which they departed from the recommendations of ADAPSO, the service bureau organization. They have stated in their own response that they feel common communications carriers, having a privileged position as government sponsored monopolies with a guaranteed profit, should not be allowed entry into new services. Their argument is that public policy dictates a rule of exclusion because of the potential for anti-competitive prac-

tice by the communications common carriers, and the need for them to concentrate their efforts towards improving the services which constitute their principal function.

VIP Systems argues that there is no need for a special data transmission network. They believe the difficulties that have been experienced in transmission quality seem more likely to be the result of communications facilities not meeting their own specifications and that a separate data communications system is not needed. They specifically request the FCC to investigate variations from specifications by existing communications facilities with a view toward restoring them to proper levels.
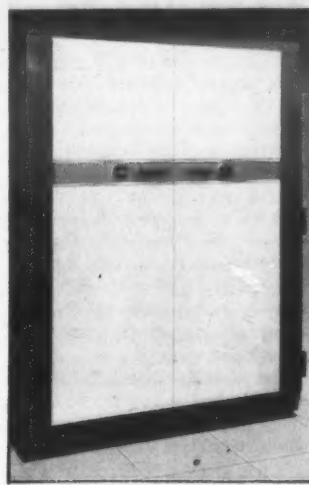
VIP systems also commented on the problems users have in obtaining proper service when more than one company is involved in providing the service.

GE Adds 600s To Time-Sharing Net

*(continued from page 1)*

availability of the service on a complete nation wide basis by the end of 1968.

The Mark II service has been under development for more than two years and has undergone extensive field testing since November 1967, by GE customers who are experiencing greater productivity and overall lower cost because of the system's faster processing speeds.

The service is being initially marketed throughout an eight state region and on a local telephone call basis in 18 metropolitan areas: Hartford, Conn.; Washington, D.C.; Chicago; Boston; Detroit; Teaneck, N.J.; New York City, Buffalo, Schenectady, Syracuse, and Mineola, N.Y.; Akron, Cincinnati, Cleveland, Columbus, Dayton, and Youngstown, Ohio; Pittsburgh and Philadelphia, Penna.

"Mark II's time sharing combines the large capacity and fast processing speed of third generation GE computer systems with the most modern computer techniques, providing subscribers with a new dimension in on-line conversational computers," stated Jerome T. Coe, general manager of GE's Information Service Dept.

Citing the many customer ori-

ented features of the new service, Coe said the large memory capacity of the Mark II system enables GE subscribers to prepare and process programs of approximately 8000 words (50,000 characters), which is twice the size of the biggest they are presently using.

"The additional capacity opens up new application areas that were not previously considered feasible with commercial services," Coe said.

A customer at one of the large U.S. chemical companies reported he is now, for the first time, able to engage regularly in corporate profit optimization studies.

He said a customer in the corporate headquarters of a large retailing firm has realized a better than ten to one improvement in processing time and a cost savings of 14% in this area

Lasers Used In Remote Scanning

*(continued from page 1)*

has been bypassed and Cognitronics is sending back ROCR (Remote Optical Character Recognition) paper tapes that are fed directly into the 360/65 computer.

Immediate Return Possible

Transmission is over normal voice grade telephone lines, and the return of the material can be handled according to customer needs. Cognitronics is currently using a time shared PDP8 system themselves and is able to return the customer's data to him in milliseconds, if necessary. To do this would require a tape unit at the user's site with the documents being edited by the PDP8 program and dumped onto the remote tape

unit without any delay at the user's site.

2-3 Keypuncher Level

Mr Jules Gronick, Cognitronics vice president of the ROCR division, told COMPUTERWORLD that they were very satisfied with the new system which they felt had now passed all the necessary operation tests. This was not their first operating system, but it is one they feel is achieving something marketable.

"We have brought the advantages of optical character recognition down to the financial level that makes it economical for anyone who currently has two or three key punchers to use it," said Gronick.

Further details on this and an evaluation of its various parts as well as the safety of laser use in this manner, will be included in an upcoming issue.

SCORE Put On H-200s, Spectra

NEW YORK — Packaged software systems for the RCA Spectra 70 and the Honeywell 200 series computers have been introduced this month by Programming Methods Inc. The new packages are modifications of the Score (Selection, COpy, and REporting) system Programming Methods developed for the IBM 360 series. Score provides a low cost means of

preparing reports and/or creating output files from existing data sets.

Reporting Options

Score uses non-procedural language and requires no knowledge of programming logic.

The select options allow for searching of the input file for any parameter or combination of parameters. The reporting options allow for up to nine lines of heading

information, unlimited editing capability, and control breaks on up to five control fields.

Copy Options

The copy options provide for copying all, or parts, of either selected or complete input records. Thus, among other applications, Score can be used as a test file generator or a convenient way of displaying test results.

Seismic Program Functions Shown By Geodigit In Canada

MINNEAPOLIS — Major seismic programming functions including digital stacking, filtering, and deconvolution are gaining more and more attention. Significant progress is reported in the digital seismic data processing field, and computers in this application are operational in the United States, Canada, and various European countries.

Considerable interest in seismic processing was evinced by major Canadian petroleum and geophysical companies, who sent more than 200 representatives to a Geodigit open house at Calgary, Alberta. Geodigit is a new digital seismic data processing center operated by Compagnie General de Geophysique (CGG), one of the world's largest geophysical contractors.

All major seismic programming functions are said to be performed by Geodigit's Advance 6040 computer, developed by Electro-Mechanical Research, Inc. (EMR).

COMPUTERWORLD applications

Game For Young Monarchs

YORKTOWN HEIGHTS, N.Y. — Grade school children are able to learn how to run a store, a company, or a country — by means of advanced computerized games. The players can actually take turns ruling a city state that flourished in 3500 BC in the Mesopotamian state of Sumer. Or, if they prefer, they can use the computer terminal setup to try managing a toy store, running a company that makes surfboards, or serving as advisors to a struggling young African nation.

Games in computer assisted instruction may be an effective means of teaching economic principles. By indicating various alternatives (with hunt and peck typing), a child can make decisions that dramatically effect the development of a country's people and economy, or that lead to wealth or bankruptcy in the world of business.

Marvelous Complexities

Computer games incorporate educational principles already in use, according to Dr Richard Wing, director of curriculum research for the Board of Cooperative Educational Services (Boces) in northern Westchester County. "They get children to act out situations instead of just reading or being told about them, and they allow a child to proceed at his own pace and receive instruction on an individual basis." This presents complexities that a computer is marvelously equipped to handle, he says. In the game in which youngsters reign over an ancient city state, the worst thing that could happen is to have the population disappear because of famine or disasters. "In almost all cases, however," Wing says, "our young rulers have left their kingdoms after a 36 year reign in pretty good shape." Each child rules over Lagash, an ancient Sumerian city state, for three 12 year periods. As he solves comparatively simple problems, he is presented with increasingly severe crises, such as rats invading the royal storehouse and grabbing up quantities of grain. He is helped in resolving these crises by the use of inventions — for example, clay jars (to foil the rats), crop rotation, fertilization, plows, and an alphabet — which actually originated in Lagash.

Making Profits

When the computer game involves managing a toy store or a surfboard manufacturing firm, the object, of course, is to make a big profit. The youngster who successfully advises the young African nation, gets that country off to a sound economic start.

It's not so easy to run a kingdom — particularly when you're only in the sixth grade and the rats eat your grain and the country you rule existed more than 5,000 years ago. But these problems, and many others almost as unusual, are being encountered by youngsters in northern Westchester County who use a typewriter-like communication terminal linked to an IBM computer. The terminal is linked by telephone to a 1401 and prints out questions, answers, background information, and instructions.

Boces, a New York State educational agency doing research in computer assisted instruction, has ordered IBM's most advanced computer, the system 360, and will use it for games as well as for administrative work and the teaching of data processing.

Sixth grader Joanne Chomich tries her hand at running a kingdom. The IBM communications terminal at which she is seated is linked to a computer stored with facts about Lagash, an ancient Mesopotamian city-state. By typing out responses to questions, suggestions, and alternatives printed by the computer on the terminal, Joanne can actually function as Lagash's ruler.

A Driverless Car In Your Future

NEW YORK — Driverless cars on computer controlled "guideways" could solve big city traffic problems. An automated transportation system could reduce accidents, congestion, and smog by letting automobiles be operated by machines instead of people.

Such a metropolitan system would replace human control with mechanical or electronic control, or both. Cars would run bumper to bumper down narrow lanes. Parking problems would be over because empty and idle autos would be automatically removed to outlying garages. Commuters could ride to work in their cars even if they did not know how to drive, and urbanites would not need operators' licenses. That is the vision of the future put forward by Dr Siegfried M. Breuning of Massachusetts Institute of Technology. He presented his views in a paper at the annual convention of the Institute of Electrical and Electronics Engineers.

Whisked Away

"Moreover," Breuning said, "these advantages probably could be obtained at lower costs than present transportation systems offer." The MIT studies, he said, envision what are called "dual-mode" vehicles. They would be able to be driven as automobiles on conventional streets. Or they could be driven onto a guideway and whisked away automatically to further destinations. Guideway scheduling and dispatching would be directed by central computers.

"The guideway could be located above or below ground," Breuning said. "It would be an addition to present transportation arteries and would relieve congestion as well as provide for expansion in capacity."

Political Problems

If the potential of automation is to be made reality, the time has come

for the building of an experimental system that engineers and scientists can use to develop and test ideas and hardware, he said. Such an experiment should be flexible so that many promising alternatives can be introduced and tried out. Therefore, the system should be shielded from an avalanche of demands for application before research is complete or even sufficiently along. Also, long range planning should accompany research on an experimental system so that when installation does occur, problems of a social, economic, or political nature can be met.

Breuning is director of the highway transportation program of MIT's Project Transport, an interdisciplinary research effort directed toward systems engineering studies of transportation. Project Transport began in 1964 with a systems engineering study of research requirements for a high speed ground transportation network of the future to serve the Boston-Washington population corridor. Preliminary studies also were started on new concepts for metropolitan transportation. Support was provided by the U.S. Commerce Department and later the Transportation Department.

"All the Symptoms"

Research on methods of improving highway safety was started in 1966 as part of a highway transportation program supported by General Motors. "It became clear very quickly that highway safety is only a symptom of inefficiencies in the total process," Breuning said. "Congestion, parking, air pollution, time in transit, and cost are all symptoms of the same inefficiency."

![COMPUTERWORLD logo] **trade news**

Hayakawa To Build Calculators For Burroughs Worldwide Market

DETROIT – Burroughs has signed an agreement with the Hayakawa Electric Co., Ltd. of Osaka, Japan for the manufacture of electronic desk calculators.

The Japanese firm has designed and will build the calculators to Burroughs specifications for Burroughs worldwide market. The calculators will be marketed in 121 countries.

The new machines, which will be formally announced in the second quarter of this year, use integrated circuits and provide 16 digits of electronic numerical display.

Burroughs president Ray W. Macdonald said: "Importing of electronic calculators from Japan is expected to further stimulate our growing exports from the United States to Japan. It is expected that in 1968 the value of Burroughs U.S. exports to Japan will be nearly three times greater than imports to the United States from Japan, including the new electronic calculators."

Sangamo Electric Takes Over RTI

SPRINGFIELD, ILL. – Sangamo Electric Co. has formed a document storage and retrieval group as part of a newly created information systems division of the company. The document storage retrieval activity was launched with an agreement for the acquisition of Recording Technology Inc. (RTI), a small northern California company.

RTI was founded two years ago by Don Eldridge, former officer of Ampex and founder of Memorex, Dr. Skip Athey, former professor at Stanford University, and H. Ragle and K. Toyota, former Memorex engineers.

Memorex Gets Three Year $20 Million Contract

SANTA CLARA, CALIF. – Memorex Corp. has received a contract to purchase Peripheral Systems 630 disk drive units from Management Assistance Inc. (MAI). The contract, potentially valued at $20 million within three years, is the largest single purchase contract in Memorex history and one of the largest purchase contracts in the peripheral equipment industry. The contract is a five year phased program, and is expected to exceed $4 million this year.

Peripheral Systems Corp. (PSC) is a Memorex subsidiary.

Initial deliveries were scheduled for March, and will scale up to an annual rate of 5000 units in early 1969. MAI will place the equipment on lease with lessees of IBM 360 systems. The disk drives will replace the 2311 drives otherwise employed by MAI customers.

Faster Access Time

PSC president Robert M. Brumbaugh said the MAI disk drive has faster average access time than its IBM counterpart, and reduced maintenance requirements. The unit is guaranteed to have plug-in compatibility with 360 series computers.

Brumbaugh attributed the advantages of the MAI equipment to the voice coil actuator of the drive's head assembly which resulted in some 40 fewer moving parts than the IBM 2311 drive's actuator.

In announcing the contract, MAI president Luke Schwalm said, "These operating advantages and the drive's full compatibility with IBM's series 360 computers which no other vendor could guarantee were the principal reasons for MAI's selection of Memorex to be its vendor." He said that the Memorex equipment would allow MAI to provide lessees with more computer throughput per dollar of operating cost and assure them less downtime and service charges.

Terms to be Announced

MAI is now preparing the detailed terms of its drive rental program and will announce them to the industry during the next 60 days.

The MAI disk drive has been under development since 1966.

And We've Added Tape!

Staff member Kate Rachstein sets press ready copy for this issue on COMPUTERWORLD's recently installed IBM Magnetic Tape Selectric Composer system. Input is recorded on tape in a Model IV MT/SC through a Selectric keyboard. Combined with layout information keyed in from a control panel, the coded tape is fed through a magnetic tape reader. Perfect final copy is then played out automatically on an IBM Composer typewriter at approximately 150 wpm – perfect, that is, to GIGO standards.

PSC Expands To The West Coast

LOS ANGELES – Programming Sciences Corp., with offices in New York and Washington, D.C., has formed a western division with headquarters at 1901 Avenue of the Stars, Century City, Los Angeles. The company expects to expand its western operations to San Francisco, San Diego, Seattle, Denver, Houston, and Dallas in the near future.

$10.2 Million Missile Contract

CONTRACTS

Computer Applications Inc. has entered into a three year contract with the Naval Weapons Center, China Lake, Calif. to provide professional and support personnel for reliability, maintainability, and system effectiveness support for a variety of Naval guided missile systems. The $4 million contract is effective immediately and provides for two one-year renewal options.

Burroughs has received a $10.2 million contract to supply computer systems for the U.S. Army's Pershing 1-A Missile System. Under the terms of the contract Burroughs defense, space and special systems group will provide the Martin-Marietta Corp's. Orlando division with D84 integrated circuit computers. The D84 performs pre-countdown, countdown, missile readiness, and guidance calculations essential for the quick reaction capability of the missile system. The Pershing 1-A, a 400-mile range ballistic missile, provides the Army with a supersonic nuclear deterrent against aggression in the field.

The contract follows a two and one half year development program under which Burroughs also provided the engineering and prototype computer systems. Burroughs was selected by Martin-Marietta after a series of performance tests to assure the Army that the missile would be capable of instant readiness while under the extremes of temperature, humidity, and transport over rough terrain.

During February, *Information Development Co.*, computer software specialist organization, was awarded contracts for new business totaling $325,000. Included in the new tasks are the design and development of two extended Fortran IV compiler systems, assembler routines, operating systems, loaders, input-output and debugging program packages, and modifications to the operating system for an IBM 360/40 configuration. With headquarters in Santa Ana, Calif., Information Development has branch offices in San Francisco, Boston, and London, England.

The Navy has awarded *Planning Research Corp.* a $65,000 contract to continue development of the Master Control Subsystem of the Navy's Command Ship Data System (CSDS), part of a computerized command/control communication network. The growing number of CSDS user sites has increased the requirements for the system's equipment, and advances in computer equipment have necessitated the updating of the system's existing programs. The combined software and hardware improvements will add to the system's basic capability, and increase its flexibility, range, and responsiveness.

URS Corp. has received a $174,000 contract to automate repair parts supply management functions for U.S. Seventh Army direct support units in Europe. The contract was awarded by the Army's Automatic Data Field Systems Command headquartered in Ft. Belvoir, Va. The program, which will use Univac 1005 hardware, is intended to improve logistic performance and reduce resource requirements. URS designed the Univac 1005 supply management system which was developed and tested at Ft. Hood, Texas, last year.

Bank Orders Turn-Key B340 — Aims To Save $850 Monthly Using It

Livingston State Bank and Trust of Denham Springs, La. has ordered a *Burroughs* B340 valued at $180,000. The system is designed specifically for banking applications. A bank spokesman estimates that it will save the bank $850 per month.

Chromcraft Inc., Senatobia, Miss., manufacturer of metal dinette furniture, has ordered a *Univac* 9300 for general business use. Chromcraft will use the system at its headquarters in Senatobia, where it produces over 120,000 dinette sets a year. The company employs about 700 people, some 20 of whom are in the data processing department.

LMC Data, Inc. has received a contract to lease over $1 million of unit record equipment to the *Bell Telephone Co.* of Pennsylvania. This is the largest single lease arrangement ever entered into by LMC.

The *U.S. Coast Guard* has installed a *Honeywell* 120 to keep track of electronic components and other supplies used by its fleet of cutters worldwide. The computer will also maintain inventory levels for general store items and ordnance

Orders and Installations

materials. One of the computer's key jobs will be to keep accurate listings of electronic repair parts for cutters in Southeast Asia.

Stanford Research Institute was one of the first customers to take delivery of an Advance 6130 computer system from *Electro-Mechanical Research, Inc.* Systems were also delivered to *Royal Aircraft Establishment* in England, *Loma Linda University*, and *Harry Diamond Laboratories* in Washington, D.C.

Scientific Control Corp., Dallas, has received a purchase order for an SCC 6700 central processing unit from Project Genie, *University of California*, Berkeley. The project, sponsored by Advanced Research Project Agency, *U.S. Defense Dept.*, is a leader in developing time sharing systems.

COMPUTERWORLD financial

Financial Page Expands

In response to numerous requests from readers, COMPUTERWORLD is expanding its financial coverage to include considerably more news and information on important aspects of the business affairs of computer firms and the investment opportunities that are available in the computer field.

On the right is an expanded table giving stock prices of leading computer firms, separated into five distinct sectors by market area. A firm is listed in one sector or another depending on which of the market areas make the largest contribution to the firm's income.

A sector index is also established for each group. The percentage stock price movements of ten firms in each sector are averaged together to establish the index each week. This is equivalent to making an equal investment, say $100, in each of the firms in the index, and noting the overall change in the value of that investment. The ten firms have been chosen from each sector as the ones most representative of the sector or most affected by the market conditions in the sector. The firms which comprise the index for each sector are indicated by an asterisk (*) on the table to the right.

A base price for each stock as of March 1, 1968 is established so that readers can gauge the change in the price of each stock over a specified period of time. The base for each of the sector indices is also established as the value of the sector index as of March 1, 1968. Changes from this base will be reflected in an index movement chart to appear in future issues of COMPUTERWORLD.

The table below gives the sector index change for the week ending March 22. The index base for each sector is taken to be 100.

Sector	Sector Index as of March 22*
Computer Systems	103.25
Peripherals & Subsystems	97.45
Supplies & Accessories	93.55
Software & EDP Services	94.97
Leasing Companies	98.75

*All sector indices are compared to an initial value of 100 based on stock prices for the firms in the index as of March 1, 1968.

Also regularly included on the financial page will be commentary on the significant movements of computer stocks during the week and "Wall Street's View," a summary of comments and recommendations by leading investment advisory firms and brokerage houses.

Comments on the expanded financial page coverage are invited from readers. They should be directed to Frederick Anderson, Financial Page Editor, at COMPUTERWORLD's editorial offices.

COMPUTER STOCKS: TRADING SUMMARY

EXCHANGE	BASE PRICE 3-1-68	WEEK AGO CLOSING PRICE	CLOSING PRICE	COMPUTER SYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	163 3/8	173	167	• Burroughs	– 6	– 3.47	– 2.23
NYSE	67 3/4	72 1/2	73 1/4	• Collins Radio	+ 3/4	+ 1.72	+ 8.85
NYSE	101 1/3	112	113 3/4	• Control Data	+ 1 3/4	+ 1.56	+ 12.07
AMSE	102	107 1/2	109 1/4	• Digital Equipment	+ 1 3/4	+ 1.63	+ 7.10
NYSE	87 1/4	88 3/8	86 3/8	General Electric	– 2	– 2.27	– 1.00
NYSE	60	66 7/8	68 3/8	Hewlett-Packard	+ 1 1/2	+ 2.24	+ 13.95
NYSE	93 1/8	101 7/8	100	• Honeywell	– 1 7/8	– 0.87	+ 7.38
NYSE	577	589 1/8	585 1/2	• IBM	– 3 5/8	– 0.62	+ 1.47
NYSE	103 7/8	108	108	• Nat Cash Register	–	–	+ 3.97
NYSE	78 1/4	79 5/8	79 1/4	Raytheon	– 3/8	– 0.46	+ 1.28
NYSE	46 7/8	46 3/8	46 7/8	RCA	+ 1/2	+ 1.08	–
•OTC	22 1/2	22 3/4	24	• Scientific Controls Corp.	+ 1 1/4	+ 5.49	+ 6.66
NYSE	116 1/8	126	121 3/4	• Scientific Data	– 4 1/4	– 3.38	+ 5.07
NYSE	45	46 1/8	44 3/8	• Sperry Rand	– 1 3/4	– 3.80	– 1.39
•OTC	45	22 1/2	20 1/4	• Systems Engineering Labs.	– 2	– 8.99	– 10.00

EXCHANGE	BASE PRICE 3-1-68	WEEK AGO CLOSING PRICE	CLOSING PRICE	PERIPHERALS & SUBSYSTEMS	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
NYSE	58 3/8	56 1/8	54 1/2	Addressograph-Multigraph	– 1 5/8	– 2.90	– 6.64
OTC	64	67	69	Alphanumeric	+ 2	+ 2.98	+ 7.81
NYSE	29	28 1/4	28 3/4	• Ampex	+ 1/2	+ 1.76	– 0.87
OTC	17 1/4	17 1/2	17	Bolt Beranek & Newman, Inc.	– 1/2	– 2.86	– 1.45
AMSE	13 1/2	13	12 1/2	Bunker-Ramo	– 1/2	– 3.85	– 7.41
AMSE	32 1/8	32	34 1/8	• Calcomp	+ 2 1/8	+ 6.64	+ 6.23
OTC	15 1/4	14 5/8	13 5/8	• Data Products	– 1	– 6.84	– 10.66
OTC	19 1/4	17 1/2	17 3/4	• Digitronics	+ 1/4	+ 1.43	– 8.79
OTC	39	36	33 1/2	• Electronic Memories	– 2 1/2	– 6.95	– 14.11
OTC	10	9 3/8	8 7/8	• Fabri-Tek	– 1/2	– 5.34	– 11.25
OTC	34	36 1/2	38 1/2	Gerber Scientific	+ 2	+ 5.47	+ 13.24
AMSE	16 7/8	16 1/4	16 5/8	Milgo Electronics	+ 3/8	+ 2.31	– 1.49
AMSE	115 1/8	137 3/4	132 3/8	• Mohawk Data Sciences	– 5 3/8	– 3.91	+ 14.98
OTC	74	83	87	• Optical Scanning Corp.	+ 4	+ 4.81	+ 17.56
OTC	72	74	72	Photon	– 2	– 2.71	–
AMSE	25 5/8	22	21 3/4	Potter Instrument	– 1/4	– 3.45	– 15.15
OTC	40 1/4	42	41 1/2	• Recognition Equipment Corp.	– 1/2	– 1.20	+ 3.11
AMSE	16	16	14 7/8	Rixon Electronics	– 1 1/8	– 7.03	– 7.03
NYSE	46 1/8	44 7/8	42 7/8	Sanders	– 2	– 4.46	– 7.05
OTC	40 1/2	35	37 1/2	• Tally Corp	+ 2 1/2	+ 7.14	+ 7.41
NYSE	242 1/4	237 1/4	230 3/4	Xerox	– 6 1/2	– 2.34	– 4.75

EXCHANGE	BASE PRICE 3-1-68	WEEK AGO CLOSING PRICE	CLOSING PRICE	SUPPLIES & ACCESSORIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	48 1/2	44	42	• Acme Visible	– 2	– 4.55	– 13.41
NYSE	41	43 1/8	42 1/8	Adams-Millis	– 1	– 2.32	+ 2.74
OTC	13 5/8	13 1/8	12 5/8	• Baltimore Business Forms	– 1/2	– 3.84	– 7.34
AMSE	27	27 1/2	26 3/8	• Barry Wright	– 1 1/8	– 4.10	– 2.32
OTC	27 1/4	28	28	Ennis Business Forms	–	–	+ 5.75
NYSE	84 1/8	86	83 3/4	• 3M Company	– 2 1/4	– 2.62	– 0.45
OTC	58	54 1/2	49	• Memorex	– 5 1/2	– 10.10	– 15.52
TOR	27 1/4	26 7/8	26	• Moore Business Forms	– 7/8	– 3.26	– 4.59
NYSE	57 1/4	55 1/8	54 1/2	Nashua Corp.	– 5/8	– 1.14	– 4.81
OTC	31 1/4	34	32 1/2	Reynolds & Reynolds	– 1 1/2	– 4.42	+ 4.00
OTC	34 1/2	29 1/2	29	Standard Register	– 1/2	– 1.70	– 15.95
NYSE	37 3/4	33 1/2	34 3/4	• Varco	+ 1	+ 2.98	– 8.61
AMSE	14 1/4	15 1/8	14 3/4	Wabash Magnetics	– 3/8	– 2.48	+ 3.51
OTC	25 3/4	25 1/2	26	• Wallace Business Forms	+ 1/2	+ 1.96	+ 0.97

EXCHANGE	BASE PRICE 3-1-68	WEEK AGO CLOSING PRICE	CLOSING PRICE	SOFTWARE & EDP SERVICES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	17	17 1/2	17	• Applied Data Research	– 1/2	–	–
OTC	15 1/2	20	19	• Aries	– 1	– 5.00	+ 22.58
AMSE	47	48 3/8	48 1/2	Automatic Data Processing	+ 1/8	+ 0.26	+ 3.19
OTC	9	8 1/2	7 1/2	• Brandon Applied Systems	– 1	– 11.77	– 16.67
AMSE	22 7/8	22 3/4	22 7/8	• Computer Applications	+ 1/8	+ 0.55	–
OTC	30	24	25	• Computer Network	+ 1	+ 4.16	– 16.27
AMSE	40	36	34 7/8	• Computer Sciences	– 1 1/8	– 3.13	– 12.82
OTC	39	40 1/2	41	• Computer Usage	+ 1/2	+ 1.23	+ 5.13
OTC	36 1/2	36 1/2	37	• Computing and Software	+ 1/2	+ 1.36	+ 1.36
OTC	12 1/2	9 3/4	9 1/2	• Digitek	– 1/4	– 2.57	– 24.00
AMSE	38 3/8	35 1/2	29	Electronic Computer Prog. Inst.	– 6 1/2	– 18.31	– 24.43
OTC	35	32	36	• Informatics	+ 4	+ 12.50	+ 2.85
OTC	11 1/2	9 1/2	8 3/4	• National Computer Analysts	– 3/4	– 7.89	– 23.92
AMSE	31	32 7/8	34 1/8	Planning Research	+ 1 1/4	+ 3.80	+ 10.08
OTC	9	8	8 1/4	• Software Research	+ 1/4	+ 3.13	– 8.34
OTC	20 1/2	17	18 1/4	TBS Computing Centers, Inc.	+ 1 1/4	+ 7.35	– 10.98
OTC	63	63	60	• University Computing	– 3	– 4.77	– 4.77

EXCHANGE	BASE PRICE 3-1-68	WEEK AGO CLOSING PRICE	CLOSING PRICE	LEASING COMPANIES	WEEK NET CHANGE	WEEK % CHANGE	% CHANGE FROM BASE
OTC	19 1/4	20 1/2	20 1/4	• Chandler Leasing	– 1/4	– 1.22	+ 5.19
AMSE	25 1/8	24	22 7/8	• Computer Leasing	– 1 1/8	– 4.69	– 8.96
OTC	12 1/4	11 3/4	11 1/2	• Cyber-Tronics	– 1/4	– 2.13	– 6.12
AMSE	106 5/8	108 3/4	108	• Data Proc, Financial & General	– 2 3/4	– 1.14	– 13.00
OTC	12 1/2	11	10 7/8	Datronic Rental	– 1/8	– 2.53	– 0.59
OTC	20	19 3/4	18 1/8	Dearborn Computer	– 1 5/8	– 8.23	– 9.38
OTC	13 1/4	12 1/2	11 7/8	• DPA, Inc.	– 5/8	– 5.00	– 10.38
AMSE	28 3/4	28 5/8	29 3/4	• GC Computer Corp.	+ 1 1/8	+ 3.93	+ 3.47
AMSE	98	97	100 7/8	• Leasco	+ 3 7/8	+ 3.99	+ 2.93
AMSE	45 7/8	49 1/2	49 3/8	• Levin-Townsend Computer Corp.	– 1/8	– 0.36	+ 7.62
OTC	10 1/2	9 1/4	10	• LMC Data, Inc.	– 3/4	+ 8.11	– 4.76
OTC	10 7/8	10 3/8	11 1/4	• Management Assistance	+ 3/4	+ 7.23	+ 2.30
AMSE	38	38	38 3/4	• Randolph Computer Corp.	+ 3/4	+ 1.97	+ 1.97
AMSE	10 7/8	10	10 3/8	U.S. Leasing	+ 3/8	+ 3.75	– 4.60

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financial items

Leasing Companies Merge

PHILADELPHIA – The Board of Directors of *Computer Leasing Corp.* (CLC), a subsidiary of University Computing Co., and *Standard Computers, Inc.* (SCI) have agreed in principle to merge the two companies, according to spokesmen for both managements. Under the terms of the proposed agreement, SCI shareholders would receive 1.9 shares of CLC for each share of SCI. The proposed merger is subject to the approval of the shareholders of both companies. On February 17, 1968 CLI acquired approximately 15% of the outstanding stock of SCI from a private investor in exchange for 6% promissory notes (at $42 per share vs. a bid price of 35 as of March 22).

On March 6, SCI's reponse to a CLC proposal to exchange CLC stock for SCI stock at a ratio fo 1.8 to 1 met with a statement that the management of SCI "was not convinced that consolidation at this time with any other enterprise was in the best interest of Standard...."

Wall Street's View

Investment Firms Pick NCR, SDS As Good Buys

Introduction: In this section each week COMPUTERWORLD's financial page editor will summarize the comments and recommendations being made on computer stocks by leading investment advisory firms and brokerage houses.

National Cash Register – Bache & Co. feels NCR is suitable for purchases up to a price of 120, where selling resistance is expected. Moore & Schley has also issued a buy recommendation on NCR, noting that the firm currently sells for about 25X probable consolidated 1968 earnings, while many other computer stocks are valued at 30X to 70X earnings. M&S feel that continued rental income from 315 and 500 series computers already installed and largely depreciated, along with a switch from a four to six year depreciation scheudle on the new Century series, will permit earnings of about $8 a share by 1971 from $3.98 during 1967.

    Control Data Corp. – Harris, Upham & Co.'s technical analysis indicates that CDC's price decline from 166 during the past five months could continue, pushing the price to the 60's where the next major level of buying support is expected. However, if CDC's stock were to show an upward or lateral move, HU&Co. notes, the stock would undergo a long period of consolidation before a sustained long term advance could be supported. Bache & Co. sharply disagrees, finding that CDC's stock price movement suggests considerable long term buying support, and traders are advised to pick up current positions for a move to 126.

Mohawk Data Sciences – Philips, Appel & Walden's stock chartist sees MDS continuing its current decline to the 124-128 level, where buying support will be met.

Scientific Data Systems – Bache & Co. feels that SDS will move from its current 121 price to an initial range of 140-143, with a collection of sellers waiting at the 150-152 area.

Computer Stocks Lose Ground As General Market Declines

NEW YORK, March 23 – Investors in computer stocks found their positions deteriorating with the general market during the week as the Dow Jones industrial average was pushed down 14 points (1.7%) to 826.

Among computer manufacturers, Systems Eng. Labs took the deepest slide, slipping 9% to 20-¼. The firm recently split 2-for-1 and the decline is attributed to profit taking by investors who took positions when word of the impending split was announced. Scientific Controls, the Dallas based maker of small scientific computers, achieved the best gain of the week, moving up 5.5% to 24. The firm is reported to be making good progress in developing its 6700 time sharing computer in collaboration with the University of California.

Firms making core memories were under heavy selling pressure last week. Fabri-tek lost 5.3% and Electronic Memories dropped 7%. These firms fell victim to a recent wave of trade magazine articles predicting the replacement of the use of magnetic cores in computers by thin film plated wires and LSI arrays during the next three to five years.

Among the DP supply firms, Memorex took a particularly heavy beating, losing 10.1% to 49. Ampex recently captured a contract to supply the majority of the Federal Government's computer tape needs during the coming fiscal year, blocking out other tape makers such as Memorex from any substantial business in this high volume market.

The service firms, always a volatile group in the stock market, proved no exception this past week. Electronic Computer Programming Institute dropped 18.3% to 29. Brandon Applied Systems declined 11.8% to 7-½.

In the computer leasing sector, Management Assistance moved counter to a general downward trend, and picked up 7.2% to 11-1/8. The firm has been moving aggressively into peripheral equipment marketing, selling Potter tape transports and Memorex disk pack drives to IBM 360 users.

IBM Replaced
Support Level Decided Order

By Joseph Hanlon

IBM's reluctance to lend support to a non-standard hospital information system caused Children's Hospital Medical Center in Boston to switch from IBM to Honeywell when they went to a larger system.

"We wanted a company that would work with us, not tell us what to do," explained Walton Devine, associate director of fiscal affairs at Children's.

Children's has long been active in developing computer applications for patient care. Without outside help, their programmers developed a bed utilization system – the first in the United States. Installed in March 1966, it achieves maximum utilization of available beds, and provides up to the minute information on patient status and location.

Clinic Scheduling by Computer

Children's then began developing a system of clinic scheduling by computer, aided by a grant of $668,621 from the U.S. Public Health Service. The scheduling system began operation early this year, and was discussed last week in COMPUTERWORLD.

As they had an IBM 360/30 already in operation for the bed utilization system, Children's first talked to IBM about scheduling. "We spent three months with all levels of the IBM management," said Devine. "They couldn't warm up to our ideas."

"Ticked Off at IBM"

"IBM is committed to HIS" (Hospital Information Systems), Devine explained, so they wouldn't listen to Children's ideas. "HIS is fine for a hospital, but we are a medical center. I was really ticked off at IBM."

Then Children's began considering other companies. The choice came down to either two Honeywell 1200's or a twin IBM 360/40 system. "We consider the 1200 equal with the 360/40," said Devine, so the decision was based on who would help. He also noted that Children's had to consider whether it was worth converting 270 major programs from IBM to Honeywell.

"Eagerness to Cooperate"

"Honeywell showed a real eagerness to cooperate," stated Devine. "They made a corporate committment." Although there have been problems, Children's is very pleased with the cooperation they are getting from Honeywell. "They have been working with us, not for us, nor us for them; it is really a team effort. That is the key thing."

Devine cited several reasons for Honeywell's cooperation with Children's. First, Honeywell had recently decided to expand into the medical field. Second, "Honeywell was excited with Children's getting into new areas. The clinic appointment system intrigued them." Also, Children's experience in the computer field and their close proximity to Honeywell's main office (Wellesley, Mass.) made Children's a logical choice for Honeywell's entry into the medical area.

Children's Computer Background

Children's extensive computer experience begins with an IBM 403. Four years ago they installed an IBM 1440. A year and a half ago they installed the IBM 360/30. Then Children's had trouble getting the 1440 out, apparently because of IBM's sales policy, according to Devine. (See "The Salesman's Dilemma," CW Nov. 22, 1967, p. 2) Children's ended up having both computers for seven months, five months longer than necessary, he said.

360/30 Found Unsuitable

Soon after the 360/30 was operational, Children's found that it was not suitable for many of their needs. It was too large for the bed utilization system, too small for the proposed clinic scheduling system, and was unable to handle their research.

"We were oversold on the 360/30 to begin with," said Devine. Children's, which does over $4 million a year in scientific and medical research, was sold the 360/30 based on its research potential. But its 64k memory was too small: "It couldn't touch our research."

LOOKING OUT FROM INSIDE a CRT at Children's Hospital Medical Center. A nurse watches as a clerk enters data into the CRT unit as part of Children's clinic scheduling system.

Then it was decided to have all scientific research done on outside computers, using Children's own computers strictly for patient care. For research, Children's established four tie lines to the Harvard University Computation Center. This is working well according to Devine. He stressed that Harvard has a greater variety of computers and more research oriented programmers, making Harvard better able to handle the research applications.

Children's therefore chose its next system strictly for patient care uses, basing the decision primarily on the support they could get from the manufacturer. They selected the two Honeywell 1200's.

The first 1200 was installed last December, and the new clinic scheduling system went into operation early this year. The second 1200 is scheduled to be installed late this year, when the 360/30 will be pulled out.

When fully operational, Children's expects to devote one 1200 completely to CRT applications, with 40 CRT terminals. Both the bed utilization program and the clinic scheduling program will be included. The other 1200 will be for batch processing and other commercial applications. In an emergency, however, it will be possible to switch systems from one computer to the other.

Devine stressed that Children's needs a dual system for the CRT systems, which operate around the clock.

Two Changes Cause Reprogramming Problem

Two major computer changes in less than two years have resulted in a major reprogramming problem. Because of extensive CRT applications, Children's found it necessary to rewrite all of their programs when they converted from 1440 to 360/30. If they had stayed with their 1440 programs, the conversion to the Honeywell 1200 would have been much simpler.

But the programs were all improved when they were rewritten for the 360/30, so few of the originals were used for the 1200. Children's has just begun reprogramming for the 1200, again improving the programs while rewriting. Thus, the 360/30 will not be replaced until the end of the year.

What About the Future?

Children's plans for the future are still unsettled. Their current concern is reprogramming for the 1200. After that, they hope to expand the clinic scheduling program and introduce other patient care programs.

They hope to include approximately 250,000 patient records in live storage; about two years of patients. One problem, according to Devine, is that "everything is just too slow." They are using 40,000 character per second CRT's, but do not yet have an interface that fast. Memory systems are also too slow.